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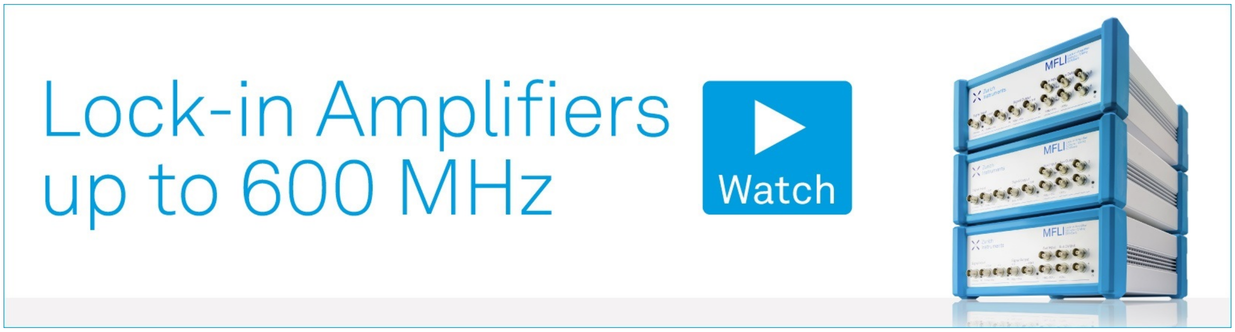

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Strangeness on the Nucleon

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The last decade a great effort has been made both experimental and theoretical on the contribution of the strange quark-antiquark pair to the electroweak nucleon structure. The experiments on Parity Violation Elastic Electron-Proton Scattering (PVep): SAMPLE [1], HAPPEX [2], PVA4 [3] and G0 [4], shed light on the electroweak vector current by measuring the PV asymmetry. On the other hand, the quasielastic neutrino-nucleus scattering experiments (MiniBooNE [5]) allow us to explore the axial contribution to the Weak Neutral Current (NC).

In Ref. [6] we review the state-of-art of the theoretical ingredients entering in the PV asymmetry in order to establish the confidence level contours for the strange electric and magnetic parameters from a global analysis of the PVep asymmetry experimental data. The specific strangeness content is given by the static strangeness parameters ρ_s and μ_s in the electric and magnetic sectors respectively. The result of our χ^2-analysis, for a specific set of theoretical inputs, is shown in Fig. 1. The ellipses (red and blue) represent the confidence contours around the point of maximum likelihood (black). The value of the point of maximum likelihood and the value of χ^2 divided by the number of degrees of freedom for the system are also explicitely shown in the figure. Although further studies and investigations are needed before definite conclusions on the strangeness content in the nucleon can be drawn, the analysis of the 1σ and 2σ confidence ellipses shows that the case of no strangeness, represented as (0,0) in this figure, is excluded by most of the fits (see [6]).

In Ref. [7] the MiniBooNE NC data [5] are used to test the validity of the Relativistic Mean Field (RMF) and Superscaling Approach model (SuSA) in such experimental scattering situation. The NC quasielastic neutrino-nucleus cross section is largely affected by the axial contribution. However, it shows a very mild dependence on the axial strangeness. Thus, in Ref. [7], the cross section data from the MiniBooNE experiment were used to improve the description of the axial form factor by fitting the axial mass parameter. Having controlled the axial form factor we studied the ratio of proton to neutron cross section. This observable presents a strong dependence on the strange axial form factor, while being almost independent on the specific model considered. In Fig.2 we present the comparation between the experimental *ratio* and our prediction. The values of the axial mass, M_A, and strange axial parameter, $g_A^{(s)}$, presented in this figure are the result of a χ^2-analysis in which the cross section and *ratio* experimental data of Ref. [5] were used.

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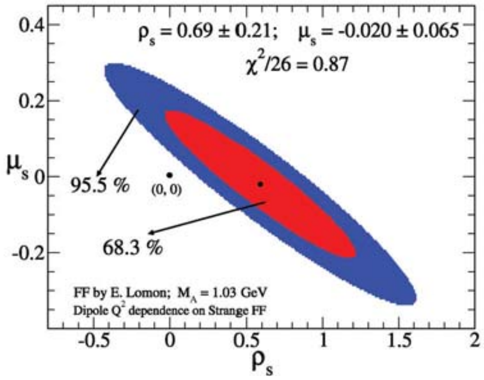

FIGURE 1. World data constraint in the $\mu_s - \rho_s$ plane. 1σ (red) and 2σ (blue) allowed region. See Ref. [6] for details.

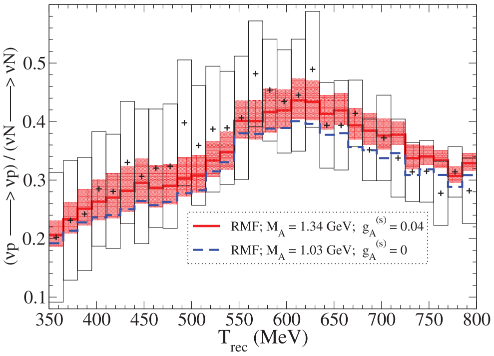

FIGURE 2. The MiniBooNE data for the *ratio* [5] (black rectangles) are compared with our prediction within the RMF model. We represent the 1σ allowed region (red area) for the static strange axial parameter, $g_A^{(s)}$, as well as the situation of zero strangeness (blue line) as reference. See Ref. [7] for details.

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